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PROBLEMS FOR SOLUTION.

ARITHMETIC.

120. **Proposed by ELMER SCHUYLER, United States Naval Academy, Annapolis, Md.**

How many balls 1 inch in diameter can be put into a cubical box 1 foot in the *clear* each way, putting in the maximum number ? [From Greenleaf's *Treatise on Algebra.*]

121. **Proposed by PAUL ROULET, A. M., Professor of Mathematics, Fairmount College, Wichita, Kan.**

Three men, named Adams, Morris, and Stoughton, with their sons, Edward, Nathan, and Walter, have each a piece of land in the form of a square. Mr. Adams' piece is 23 rods longer on each side than Nathan's, and Mr. Stoughton's piece is 11 rods longer on each side than Edward's. Each father has 63 square rods of land more than his son. Which of these persons is father and son, respectively ?

⁂ Solutions of these problems should be sent to B. F. Finkel not later than Dec. 10.

ALGEBRA.

109. **Proposed by B. F. FINKEL, A.M., M.Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.**

$\frac{1}{\sqrt{(x+1)}}+\frac{1}{\sqrt{(x-1)}}=\frac{1}{\sqrt{(x^2-1)}}$; find value of x satisfying this equation.

110. **Proposed by J. C. CORBIN, Pine Bluff, Ark.**

I find the annexed problem in a secular newspaper:

Put down any sum of pounds, shillings and pence under £11, taking care that the number of pence is less than the number of pounds. Reverse this sum, putting pounds in the place of pence, and subtract from original amount. Again reverse this remainder and add. The result in all cases will be £12 18*s* 11*d*, neither more nor less, whatever the amount with which we start.

Will some of the MONTHLY's contributors verify and explain or disprove it?

⁂ Solutions of these problems should be sent to J. M. Colaw not later than Dec. 10.

GEOMETRY.

128. **Proposed by W. H. CARTER, Vice-President and Professor of Mathematics, Centenary College, Jackson, La.**

Given $F=\Delta^{n-1}\div(n-1)!.\Delta_1.\Delta_2\ldots\ldots\Delta_n$ where Δ=the determinant $(a_1b_2c_3\ldots\ldots k_n)$ and $\Delta_1\Delta_2\ldots\ldots\Delta_n$ are the minors of the elements of the nth column; and a_m, b_m, $c_m\ldots\ldots$etc., $(m=1, 2, 3\ldots\ldots n)$ are the coefficients of n given equations containing $n-1$ variables. Show (1) that $n=3$, F=the area of a triangle, and (2) if $n=4$, F=the volume of the tetrahedron.

129. **Proposed by WILLIAM HOOVER, A.M., Ph.D., Professor of Mathematics and Astronomy, Ohio University, Athens, Ohio.**

Show that at no point of an ellipse will the circle of curvature pass through the center, if the ecentricity be less than $\frac{1}{2}\sqrt{2}$.